

# Change in the scenery

Michael Church

**Global Geomorphology.** By Michael A. Summerfield. Longman: 1991. Pp. 537. £17.99.

GEOMORPHOLOGY ought to be the most interesting part of the Earth sciences. Landscape is accessible, and most people have at least a passing interest in how scenery came to be the way it is. Moreover, human societies draw nearly all of their resources from the surface of the land, and build nearly all of their structures there. But by the time the idea of plate tectonics burst upon us 30 years ago, geomorphologists had already begun to be preoccupied with the mechanics of erosion on local scales, and so the subject became a backwater.

Nevertheless, the founders of the modern subject — pre-eminently W. M. Davis and L. C. King — were certainly aware of the essential interplay of tectonics, erosion and sedimentation in creating landforms. Recently, geomorphologists have started to regain this perspective. *Global Geomorphology* makes the most determined attempt yet to exemplify it in a textbook. Accordingly, the book is divided into three principal sections concerned with endogene processes (read 'tectonics'), exogene processes (erosional development of the landscape), and endogene-exogene interactions. In the last of these, emphasis is given to rates of uplift and denudation, to tectonic control of drainage and sea level, and to long-term landscape development. The plan of the book is stimulating.

But the book is far less successful at surmounting some other important issues that have dogged the subject. Geomorphology is not highly quantified, mainly because at the scale of large landforms it is dominated by complex boundary conditions, making it difficult to give an adequate analytical representation of the phenomena involved. Furthermore, geomorphologists deal chiefly with one Earth and its history: sequences of events often appear to be unique, and the number of tolerably similar phenomena is frustratingly small. Summerfield gives an illuminating discussion of these issues in his opening chapter (although I doubt that inexperienced students will appreciate it properly), but sublimates them in the rest of the book by adopting a completely verbal and descriptive manner. The author claims that a mathematical treatment would simply not be appropriate for most students. But this compromise

demotes the book to being a description for nonspecialists, rather than the important summary of the field that it might otherwise have been.

A verbal argument can be exciting if it conveys ideas and arguments in a lucid and provocative way. But Summerfield is so preoccupied with definitions and classifications that basic principles are obscured or slighted. In the discussions of tectonic effects, he emphasizes the difficulties in attempting to reduce to simple models the features of complex, unique landscapes in which history and configuration matter a lot. But the reading is heavy-going because there is no unifying thread. Even the generous number of pictures and diagrams, borrowed from many sources, reinforce the sense of there being too many details and too little essential explanation. In the more traditional sections on exogene processes, the obverse problem arises. The discussion fails to illustrate that geomorphological processes are complex physical and chemical phenomena. The forces on slopes, fluid flow and sediment trans-

port — the fundamental phenomena in the formation of most landscapes — remain inadequately characterized.

The book is intended to be read by undergraduates who have a basic knowledge of the physical environment. For them its outstanding feature is that it collects all its references into short bibliographic essays at the close of each chapter. The choice of references is especially good. Paradoxically, though, the book may be of most value to more advanced students, for whom it presents some interesting themes and questions. It re-emphasizes the history of individual landscapes, focuses on the interaction of tectonics and erosional development of landscape, and questions whether the geomorphology of other planets should become a larger part of the traditional subject matter. The author has a worthwhile vision of the field, but unfortunately has not presented it well. □

*Michael Church is in the Department of Geography, University of British Columbia, Vancouver, Canada V6T 1Z2.*

# No more, no less

B. C. Jarvis

**Plant Physiology.** By Lincoln Taiz and Eduardo Zeiger. Addison-Wesley: 1991. Pp. 559. £21.95.

THE problem facing authors of general texts such as this is not so much what to include, but rather what to leave out. The objectives of Taiz and Zeiger are admirable — to outline the principles of physiological investigations and to discuss a wide array of physiological processes in plants, while attempting "to convey the excitement and direction of contemporary research". To these ends they have elicited contributions from 21 other researchers, and have achieved a consistency of style and clarity.

The book begins with a 'primer' that describes plant and cell architecture and examines fundamental concepts about energy, enzymes and gene expression. Basic it may be, but it is essential background material. A section on the control of metabolism *per se*, however, would have added to its usefulness.

The remaining 19 chapters are grouped conventionally into three units: 'Transport and Translocation of Water and Solutes', 'Biochemistry and Metabolism' and 'Growth and Development'. The first two discuss how plants acquire their resources, transport them and convert them into biological materials, and translocate these to areas of growth and storage. As befits its importance, photo-

synthesis receives the greatest attention. Here the intrinsic link between structure and function is made evident. The basis of growth and differentiation is covered in the third unit. Individual chapters are devoted to the hormones or chemical regulators that influence these processes; to phytochrome, a red-light receptor that initiates numerous changes within plants; and to the control of flowering, which acquaints the newcomer with the complex interactions between external and internal factors involved in plant development.

Overall there is an impressive coverage of a wide range of topics, but inevitably some receive only cursory treatment. Figures abound in each chapter and are usually informative. The boxed essays that accompany each chapter, however, constitute a mixed bag. A few briefly describe important methods often used in physiological investigations, others focus on topics related to the text. Despite some eye-catching titles, they are largely unimpressive. Better selection of the topics could have prevented the misleading impression sometimes created by omissions in the text. It is regrettable, for example, that the wall is viewed here as a 'passive' component of the cell, and that fructans, the most important reserve carbohydrate of cereals, receive no coverage. Nevertheless, the book will please many students, not least because it deals with diverse and complex issues in a clear and manageable way. □

*B. C. Jarvis is in the Department of Animal and Plant Sciences, Sheffield University, Western Bank, Sheffield S10 2TN, UK.*